Document ID:TFR-2520
Revision ID:0
Effective Date:5/14/02

Technical and Functional Requirements

Technical and Functional Requirements for the ICDF Complex Control System

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

Idaho National Engineering and Environmental Laboratory

Form 412.14
07/24/2001
Rev. 03

CONTENTS

1. INTRODUCTION 4

1.1 System Identification 4
1.2 Limitations of the T&FR 4
1.3 Ownership of the T&FR 4
1.4 Specific Regulatory and Legal Commitments 5
1.5 Definitions/Glossary 5
1.6 Acronyms 5
1.7 Key Assumptions 7

2. OVERVIEW 9

2.1 System Functions 9

2.1.1 Facility Overview 9
2.1.2 Control and Data Acquisition System 9

2.2 System Classifications 12
2.3 Operational Overview 12

2.3.1 Control and Data Acquisition System 12

3. REQUIREMENTS AND BASES 13

3.1 Functional and Performance Requirements 13

3.1.1 System 13
3.1.2 Subsystem and Major Components 13
3.1.3 Boundaries and Interfaces 14
3.1.4 Codes, Standards, and Regulations 15
3.1.5 Operability 17

3.2 Special Requirements 18

3.2.1 Radiation and Other Hazards 18
3.2.2 ALARA 18
3.2.3 Nuclear Criticality Safety 18

3.2.4 Industrial Hazards 18
3.2.5 Operating Environment and Natural Phenomena 19
3.2.6 Human Interface Requirements 19
3.2.7 Environmental Management 20
3.2.8 Special Configuration Management Requirements 20
3.2.9 Other 20

3.3 Engineering Design Requirements 20

3.3.1 Civil and Structural 20
3.3.2 Mechanical and Materials 21
3.3.3 Chemical and Process 21
3.3.4 Electrical Power 21
3.3.5 Instrument and Control 22
3.3.6 Computer Hardware and Software 28
3.3.7 Fire Protection 28

3.4 Testing and Maintenance Requirements 28

3.4.1 TSR-Required Surveillance 28
3.4.2 Non-TSR Inspections and Testing 28
3.4.3 Maintenance 29

3.5 Other Requirements 29

3.5.1 Security and Special Nuclear Material (SNM) Protection 29
3.5.2 Special Installation Requirements 30
3.5.3 Reliability, Availability, and Preferred Failure Modes 30
3.5.4 Quality Assurance 30
3.5.5 Miscellaneous 30

4. REFERENCES 31

5. APPENDICES 32

FIGURES

2.1-1. ICDF Complex layout 10

TABLES

1.7-1. Key assumptions 7

2.1-1. Structure summary 11

3.1-1. Design standards for the ICDF control system 15

1. INTRODUCTION

The purpose of this document is to provide the technical and functional requirements (T&FRs) for the control, monitoring, and information systems at the INEEL CERCLA Disposal Facility (ICDF) Complex. The ICDF Complex is an engineered facility that will include the necessary subsystems and support facilities to provide a complete waste disposal system for incoming waste from various Idaho National Engineering and Environmental Laboratory (INEEL) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation sites for on-Site disposal or shipment off-Site. The major subsystems and support facilities of the ICDF Complex are the disposal cells, evaporation pond, administrative facility, staging and storage pads, weigh scale, decontamination facility, and treatment facilities (soil stabilization and microencapulation of debris). This T&FR is to be used in conjunction with the T&FRs for the ICDF and evaporation pond (TFR-71) and the WAG 3 Staging, Storage, Sizing, and Treatment Facility (SSSTF) (TFR-17). While TFR-17 and TFR-71 provide the requirements for their respective ICDF Complex subsystems, this T&FR provides the requirements for the controls, monitoring, and information processing support for the ICDF Complex as a whole.

1.1 System Identification

The ICDF Complex will utilize a computer control and data acquisition system for leak detection, sump level monitoring, pump control, flow recording, alarming, and temperature monitoring for freeze protection. The system will include a centralized control station and data archiving system in addition to local indication and control.

1.2 Limitations of the T&FR

This document only includes criteria for the control, monitoring, and information systems at the ICDF Complex. It does not include fire protection, voice paging, or telephone systems. It should be used in conjunction with, and in support of, TFR-71 and TFR-17.

1.3 Ownership of the T&FR

The ICDF project manager has the ultimate responsibility for the content and approval of the document. Updates to this T&FR will be processed in accordance with the ICDF project and BBWI policies and procedures.

1.4 Specific Regulatory and Legal Commitments

The guiding regulatory document is the OU 3-13 ROD (DOE-ID 1999).

1.5 Definitions/Glossary

Component. Item of equipment, such as pump, valve, or relay, or an element of a larger array, such as computer software, length of pipe, elbow, or reducer.

Environmental Requirement. A requirement related to the environment and, specifically, to environmental permitting.

Mission-Critical Requirement. A requirement necessary to prevent or mitigate substantial interruptions of facility operations or severe cost or other adverse impacts, or those that are necessary to satisfy DOE programmatic mission considerations.

Other Requirement. A requirement that does not fit in the other safety, environmental, or mission-critical classifications.

Other Safety Requirement. A requirement, necessary for a system, structure, or component (SSC) to perform functions considered important to overall facility safety and as part of worker safety or the defense-in-depth safety basis for the facility.

Structure. Elements that provide support or enclosure, such as buildings, freestanding tanks, basins, dikes, and stacks.

System. Collection of components assembled to perform a function, such as HVAC systems, control systems, utility systems, reactor cooling systems, or fuel storage systems.

1.6 Acronyms

ARAR	applicable, relevant and appropriate
ASA	auditable safety analysis
CAM	continuous air monitoring
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CM	configuration management

CRT	cathode ray tube
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
EDF	Engineering Design File
EP	evaporation pond
ER	Environmental Restoration (Group)
GDE	guide
HMI	human-machine interface
HVAC	heating, ventilating, and air conditioning
ICDF	INEEL CERCLA Disposal Facility
ID	identification
IEEE	Institute of Electrical and Electronic Engineers
I/O	input/output
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LLW	low-level waste
ma	milliampere
MCC	motor control center
MCP	management control procedure
MLLW	mixed low-level waste
NFPA	National Fire Protection Association
OU	operable unit
PC	personal computer
PLC	programmable logic controller
PRD	program requirements document
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
ROD	Record of Decision
SAR	Safety Analysis Report
SSSTF	Staging, Storage, Sizing, and Treatment Facility

STD	standard
T&FR	technical and functional requirement
UPS	uninterruptible power supply
VAC	Volts, alternating current
VDC	Volts, direct current
WAG	waste area group

1.7 Key Assumptions

The OU 3-13 ROD defines the scope of work for the ICDF Complex activities. The assumptions shown in Table 1.7-1 were created to further clarify and/or define limiting factors and conditions associated with that scope.

Table 1.7-1. Key assumptions.

ID	Assumption	Requirement
A	The ICDF Complex will need to monitor, control, and archive key operating conditions.	1
B	The ICDF Complex main control station and archiving system will be centralized in the administration trailer.	2
C	The landfill and evaporation ponds will have their own control and data acquisition system that will provide necessary data to the control station in the administration trailer.	3, 4
D	The ICDF Complex control and DAS will provide necessary control and operator interfaces to support the ICDF Complex operations.	3, 4
E	Since the ICDF Complex will not be occupied continuously, a general alarm will be sent to an INTEC location that is continuously manned in order for corrective action to be initiated at the ICDF Complex.	5
F	The ICDF Complex control system will have the capability of interfacing with the treatment system.	6
G	The control system will need to operate year round.	7

Table 1.7.1 (continued).

ID	Assumption	Requirement
H	The ICDF Complex control system will incorporate all reasonable design features to enhance ease of repair.	50
I	The ICDF Complex control system will incorporate all reasonable design features to enhance safety in operation and maintenance.	15, 22
J	Human-machine interfaces (HMIs) will be needed in ICDF Complex buildings to assist operators.	13
K	The monitoring, control, and archiving system will use common good engineering and area operating practices.	15
L	Sensitive equipment will need a 15-min uninterruptible power supply.	16
M	All pump actions will need to be archived.	40
N	All alarms will need to be archived.	28
O	Rad Engineering–identified CAMs will be installed in the decontamination building.	8, 41
P	Designs will accommodate maintenance and calibration.	46
Q	The control system, to the extent possible, must notify operators of faulty signals or processing.	19
R	A commonly used programmable logic controller (PLC) manufacturer and personal computer (PC) manufacturer will be used to monitor, control, and archive conditions at the ICDF Complex. This will ensure compatibility and maintainability of the control system.	12
S	Quantify and account for all level changes in the evaporation pond.	35

2. OVERVIEW

2.1 System Functions

2.1.1 Facility Overview

The ICDF Complex from the control and data acquisition viewpoint will contain four buildings, an evaporation pond of two cells, and a landfill (see Figure 2.1-1). The pond and landfill each have a building associated with them. There is a decontamination and waste treatment building and an administration building. The structure identifier, description, and related signals are listed in Table 2.1-1. For the purposes of this T&FR, the pond cells will be referred to as two separate ponds and leak detection chambers and sumps will both be referred to as sumps. For details of these signals see Section 3.3.5.2 and Appendix A.

2.1.2 Control and Data Acquisition System

The ICDF Complex will have a variety of conditions that will need continuous monitoring and some degree of control. In addition to control and monitoring, the system will need to archive a variety of conditions such as alarms and flow totals.

Two key features of the control system will be the ability to interface with the controls designed and installed by the subcontractors of the landfill and evaporation ponds with SSSTF and the ability to interface with one of the control rooms at INTEC. Much of the input to the ICDF control system will be from the landfill and evaporation ponds. This will consist primarily of flow totals and levels. In addition to the inputs from the landfill and evaporation ponds control system, the ICDF Complex control system will receive alarms and trips from ventilation, levels, and radiation monitoring in the SSSTF.

The SSSTF will include a treatment operation. The needed control functions will be incorporated into the control and data acquisition system. This should be considered in the design of the ICDF Complex control system.

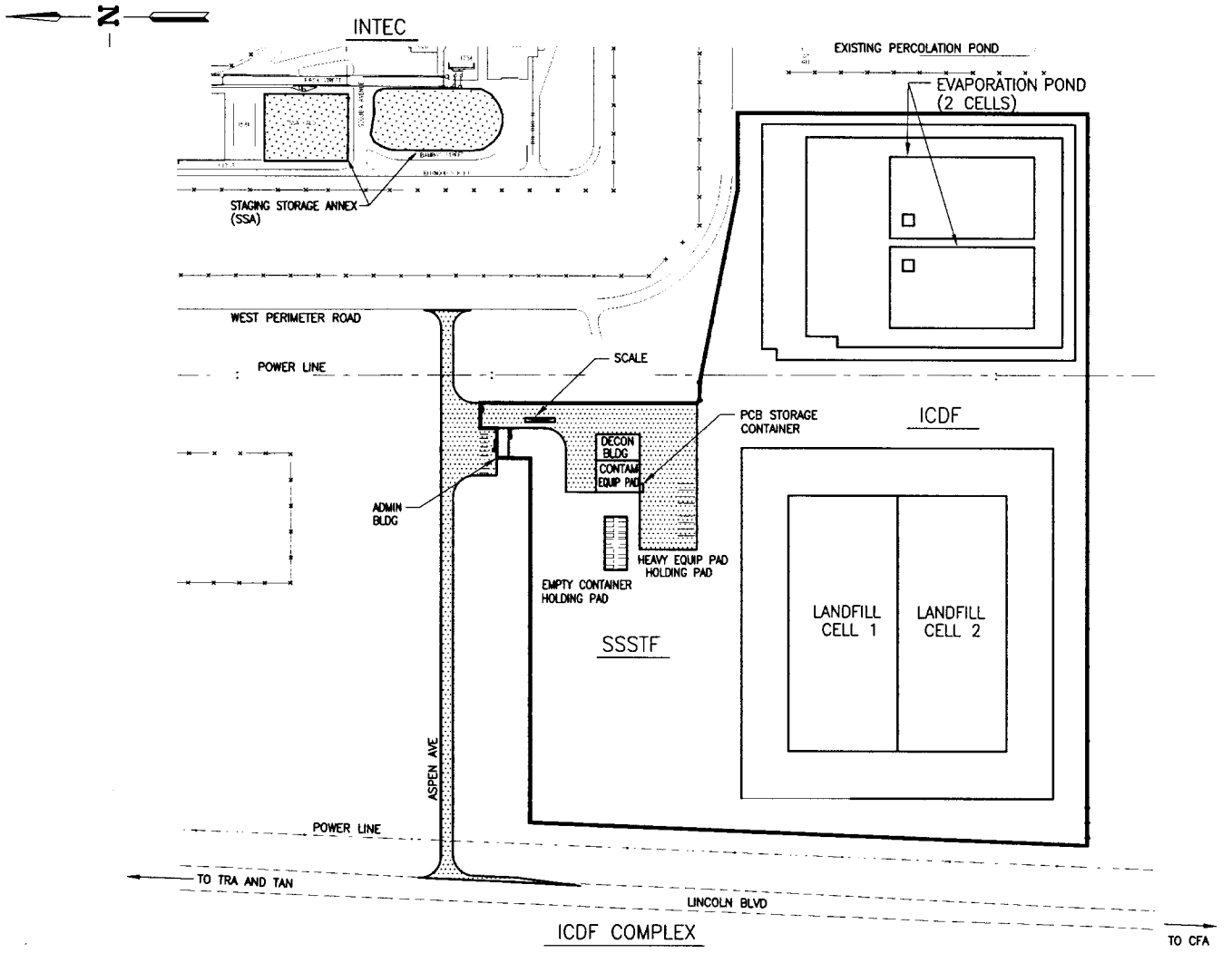

Figure 2.1-1. ICDF Complex layout.

Table 2.1-1. Structure summary.

Structure Identifier	Structure Description	Related Sump	Related Control System Signals
CPP-2701	Landfill	SU-CD-103 SU-CD-104 SU-CD-108	Control and status of pumps (P-CD-203-1 and P-CD-203-2) related to SU-CD-103. Control and status pump P-CD-204 related to SU-CD-104. Control and status pump P-CD-208 related to SU-CD-108. Output flow of all four pumps. Levels in all three sumps. Leak detection in double-wall pipe between sumps and ponds.
POND-CD-329	West pond	SU-CD-102	Sump level.
POND-CD-328	East pond	SU-CD-101	Sump level.
CPP-1799	Landfill crest pad building	SU-CD-105	Sump level. Sump pump P-CD-205 status and control. Building temperature.
CPP-1798	Ponds crest pad building	SU-CD-106	Sump level. Building temperature.
CPP-1688	Decontamination and treatment building	NA	Six outlet ventilation filter differential pressure signals. Two outlet ventilation flows. Two building radiation detector alarm signals. Building temperature.
CPP-1689	Administration building	NA	Building temperature.
MAH-YDJ-SW-498	Decontamination pump lift station	NA	Status of two pumps. Secondary containment leak detection.

The major components of the ICDF Complex control system will include field instrumentation, discrete and analog input/output modules, programmable logic controllers (PLCs), human-machine interfaces (HMIs), and the communications to connect each of these components. The field instrumentation will include sensors and transmitters, which will collect and communicate data, and motor starters, which will allow physical actions to be taken based on this data. The input/output modules will provide an interface between the field instrumentation and the PLCs. This interface will allow data received from the field instrumentation to be assigned to variables (inputs) and will provide a path for variables from the logic to initiate actions in the field (outputs). The PLCs will utilize the data inputs and programmed control logic to monitor conditions in the field and initiate appropriate actions in the form of alarms or outputs to field devices. This type of controller is commonly used and easily programmed. The HMIs will consist of local operator interfaces located at each PLC location and a central control station located in the administration trailer, which will include data from all of the PLCs in the ICDF Complex. All of this equipment will be connected through duct banks via copper or fiber optic cable.

2.2 System Classifications

The auditable safety analysis (ASA) is in development. The preliminary classification is "Low Safety Consequence."

2.3 Operational Overview

2.3.1 Control and Data Acquisition System

The ICDF Complex control system will monitor the operations of the SSSTF, the conditions of the evaporation pond, and the conditions of the landfill. Most of the control system functions will be the monitoring of levels, flows, and alarms within the ICDF Complex. The monitoring data on levels and flows will be archived. This will allow the ICDF operators to account for any normal or abnormal event in the operation of the Complex. The operators can check the status of the operating conditions at their convenience. Should an alarm condition occur, the controls would immediately notify the operators, who would initiate the appropriate corrective actions. Alarm conditions would also be transmitted to a control room in INTEC. This will be necessary since the SSSTF Administration Trailer will not be occupied continuously. In

addition to monitoring, many of the operating conditions of the Complex will be archived. This information can be retrieved and used in reports that will be required by outside agencies as a condition for operation.

The ICDF Complex control system software will be controlled and managed by ICDF operations under the guidance of MCP-550 and related MCPs. This will permit ICDF operations to make any necessary software configuration changes to enhance operation while maintaining an auditable record.

3. REQUIREMENTS AND BASES

3.1 Functional and Performance Requirements

3.1.1 System

Rqmt ID: 001 Rqmt Classification: Other

Rqmt Text: The ICDF Complex shall utilize a computer control and data acquisition system to monitor, control, and archive operating conditions.

Rqmt Basis: This system performance is necessary for the operation of the ICDF Complex.

Rqmt Reference: Table 1.7-1, Assumption A.

Rqmt ID: 002 Rqmt Classification: Other

Rqmt Text: The control and data acquisition system shall have a centralized station in the administration trailer.

Rqmt Basis: The ICDF Complex will be managed from the administration trailer.

Rqmt Reference: Table 1.7-1, Assumption B.

3.1.2 Subsystem and Major Components

Rqmt ID: 003 Rqmt Classification: Other

Rqmt Text: The control and data acquisition system shall be a PLC-based system with the following configuration: data collection PLCs in Buildings CPP-1799, CPP-1798, and CPP-1688; operator interface panels (HMI) at Buildings CPP-1799, CPP-1798, and CPP-1688; distributed field instruments; and an operator display and archive system in the administration trailer, CPP-1689.

Rqmt Basis: To adequately operate and monitor status of the facility.

Rqmt Reference: Table 1.7-1, Assumptions C and D.

3.1.3 Boundaries and Interfaces

Rqmt ID: 004 Rqmt Classification: Other

Rqmt Text: The ICDF control system shall interface with instruments in the landfill, decontamination building, and evaporation ponds.

Rqmt Basis: The ICDF control system will need to monitor operating conditions in all areas of the ICDF Complex.

Rqmt Reference: Table 1.7-1, Assumptions C and D.

Rqmt ID: 005 Rqmt Classification: Other

Rqmt Text: The ICDF control system shall have a networked interface with a control room at INTEC.

Rqmt Basis: The ICDF Complex will need to be monitored when the administration building is not manned.

Rqmt Reference: Table 1.7-1, Assumption E.

Rqmt ID: 006 Rqmt Classification: Mission Critical

Rqmt Text: The control system shall have the capacity to interface with a treatment operation.

Rqmt Basis: To monitor operation of the treatment process.

Rqmt Reference: Table 1.7-1, Assumption F.

3.1.4 Codes, Standards, and Regulations

The specific codes, standards, and regulations that have been applied to the system are referenced in Section 4. Table 3.1-1 lists design standards for the system.

Table 3.1-1. Design standards for the ICDF control system.

Design Standards	Description	Applies To	Imposed By
National Codes and Regulations			
29 CFR 1910	Occupational Safety and Health Standards for General Industry	Workers	Contract DE-AC07-99ID13727
29 CFR 1926	Occupational Safety and Health Regulations for Construction	Workers	Contract DE-AC07-99ID13727
Industry Standards			
NFPA 70	National Electrical Code	Design practices	DOE-ID Architectural Engineering Standards (AES)
NFPA 70E	Electrical Safety Requirements for Employee Workplaces	Design practices	DOE-ID Architectural Engineering Standards (AES)
NFPA 75	Protection of Electronic Computer/Data Processing Equipment	Design practices	DOE-ID Architectural Engineering Standards (AES)
NFPA 780	Lightning Protection Code	Design practices	DOE-ID Architectural Engineering Standards (AES)
IEEE 610.12-1990	IEEE Standard Glossary of Software Engineering Terminology	Design practices	DOE G200.1-1

Table 3.1-1. (continued).

Design Standards	Description	Applies To	Imposed By
IEEE 830	IEEE Recommendation for Software Requirements Specifications	Design practices	DOE G200.1-1 Chapter 6
IEEE 982.1	IEEE Standard Dictionary of Measures to Produce Reliable Software	Design practices	TFR-2520
IEEE 982.2	IEEE Guide for the Use of IEEE Standard Dictionary of Measures to Produce Reliable Software	Design practices	TFR-2520
IEEE 1012	IEEE Standard for Software Verification and Validation	Design practices	DOE G200.1-1 Chapter 6
IEEE 1016	IEEE Recommended Practices for Software Design Description	Design practices	DOE G200.1-1 Chapter 6
IEEE 1058	IEEE Standard for Software Project Management Plans	Design practices	TFR-2520
IEEE 1063	IEEE Standard for Software User Documentation	Design practices	DOE G200.1-1 Chapter 7
IEEE 1074	IEEE Standard for Software Life Cycle Procedures	Design practices	DOE G200.1-1 Chapter 6
EIA 568A	Commercial Building Telecommunications Cabling Standard	Design practices	TFR-2520
ICEA S-83-596	Fiber Optic Premises Distribution Cable Technical Requirements	Design practices	TFR-2520
NEMA 250	Enclosures for Electrical Equipment	Design practices	TFR-2520
DOE & DOE-ID Directives			
DOE O 414.1	Quality Assurance	Workers, design practices	Contract DE-AC07-99ID13727
DOE O 420.1	Facility Safety	Workers	Contract DE-AC07-99ID13727

Table 3.1-1. (continued).

Design Standards	Description	Applies To	Imposed By
DOE O440.1A	Worker Protection Management for DOE Federal and Contractor Employees	Workers	Contract DE-AC07-99ID13727
DOE O 5480.4	Environmental Protection, Safety, and Health Protection Standards	Design practices and workers	Contract DE-AC07-99ID13727
DOE-ID AES	DOE-ID Architectural Engineering Standards (AES)	Design practices	DOE-ID-N-430.1
Other			
MCP-550	Software Management	Control system software	PRD-5092
GDE-59	Computer Systems Change Control	Control system software	MCP-550
MCP-3630	Computer System Change Control	Control system software	PRD-5092
STD-107	INEEL Configuration Management Program	Control system software	PRD-115

3.1.5 Operability

Rqmt ID: 007 Rqmt Classification: Other

Rqmt Text: The control and data acquisition system shall be operable year round.

Rqmt Basis: The ICDF Complex will operate year round.

Rqmt Reference: Table 1.7-1, Assumption G.

3.2 Special Requirements

3.2.1 Radiation and Other Hazards

Special requirements for addressing radiation and other hazards are given in TFR-17 and TFR-71. This T&FR presents individual control-related requirements necessary to complement the radiation and other hazards protection features of the SSSTF, landfill, and evaporation ponds.

3.2.2 ALARA

Rqmt ID: 008 Rqmt Classification: Other Safety

Rqmt Text: Warning lights shall be mounted on the exterior of the decontamination building to indicate a CAM alarm.

Rqmt Basis: To prevent operators from entering the building and possibly being exposed to airborne contamination.

Rqmt Reference: DOE-HDBK-1140-2001, Section 2.3.2.15.5, Table 1.7-1, Assumption O.

3.2.3 Nuclear Criticality Safety

Not applicable based on ICDF classification of "Non-nuclear, Radiological".

3.2.4 Industrial Hazards

Rqmt ID: 009 Rqmt Classification: Other Safety

Rqmt Text: In control cabinets and enclosures, electrical terminals at greater than 50 and less than 300 volts shall be covered, guarded, or finger-safe.

Rqmt Basis: Provide increased safety for maintenance workers.

Rqmt Reference: DOE-HDBK-1140-2001, Section 2.9.14.3.

3.2.5 Operating Environment and Natural Phenomena

Rqmt ID: 010 Rqmt Classification: Other

Rqmt Text: Control and data acquisition components mounted outside shall be rated for -35°F to 100°F and 0-100% relative humidity.

Rqmt Basis: Instruments must be specified for their environment. Based on DOE/ID-12118, these are temperature and humidity extremes for the INEEL.

Rqmt Reference: DOE/ID-12118.

Rqmt ID: 011 Rqmt Classification: Other

Rqmt Text: All control and data acquisition components shall be suitable for a natural phenomena category PC-1 and standard background radiation (no special radiation resistance required).

Rqmt Basis: Instruments must be suitable for their environment.

Rqmt Reference: DOE-STD-1020.

3.2.6 Human Interface Requirements

Rqmt ID: 012 Rqmt Classification: Other

Rqmt Text: The ICDF Complex shall use the INEEL company standard PC for interfacing with the control and data acquisition to the field input/output devices. See the following INEEL web site: http://opscenter.inel.gov/catalog/systemsview.html

Rqmt Basis: Ease of maintenance.

Rqmt Reference: Table 1.7-1, Assumption R.

Rqmt ID: 013 Rqmt Classification: Other

Rqmt Text: Human-machine interfaces (HMI) or operator panels will be located in the leachate collection building (CPP-1799), decontamination building (CPP-1688) and the evaporator ponds building (CPP-1798).

Rqmt Basis: For effective operator access.

Rqmt Reference: Table 1.7-1 Assumption J.

3.2.7 Environmental Management

Individual requirements for Environmental Management are contained in sections of this T&FR as well as TFR-17 and TFR-71. For example, Section 3.3.5 of this T&FR addresses the requirements of instrumentation and controls for the ICDF Complex.

3.2.8 Special Configuration Management Requirements

Rqmt ID: 014 Rqmt Classification: Mission Critical

Rqmt Text: The software of the control system shall be maintained under a configuration management program.

Rqmt Basis: To ensure the integrity of software.

Rqmt Reference: MCP-550, "Software Management."

3.2.9 Other

NA

3.3 Engineering Design Requirements

3.3.1 Civil and Structural

No special civil or structural requirements are needed for ICDF control system.

3.3.2 Mechanical and Materials

No special mechanical or material requirements are needed for ICDF control system.

3.3.3 Chemical and Process

No special chemical or process requirements are needed for ICDF control system.

3.3.4 Electrical Power

Rqmt ID: 015 Rqmt Classification: Other

Rqmt Text: Instrument and control system components shall be powered from 120 VAC or less than 40 VDC.

Rqmt Basis: To match existing control systems at INTEC.

Rqmt Reference: Table 1.7-1, Assumptions K and I.

Rqmt ID: 016 Rqmt Classification: Other

Rqmt Text: All digital equipment storing ICDF Complex information shall be supported for 15 minutes by an uninterruptible power supply (UPS).

Rqmt Basis: To perform an orderly shutdown of equipment without the loss of information.

Rqmt Reference: Table 1.7-1, Assumption L.

3.3.5 Instrument and Control

3.3.5.1 General Requirements for Measurement and Control Loops

Rqmt ID: 017 Rqmt Classification: Other

Rqmt Text: All process variables needed to operate a pump will be made available at the HMI closest to that pump. Process variables shall include the level of location being pumped from and level of location being pumped to, any alarms and/ or interlocks related to pump operation, and pump flow data.

Rqmt Basis: Ease of operation.

Rqmt Reference: 40 CFR 264.301, 40 CFR 264.226(d)(3), IDAPA 58.01.05.008.

Rqmt ID: 018 Rqmt Classification: Other

Rqmt Text: Analog signals shall be displayed to the operator in engineering units.

Rqmt Basis: For effective operation.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1665-7.5.

Rqmt ID: 019 Rqmt Classification: Other

Rqmt Text: Control system shall monitor each analog input and alarm if the process signal is out of its range. For example, alarm on a 3-ma input from a 4 to 20-ma device.

Rqmt Basis: To identify bad information to operators.

Rqmt Reference: Table 1.7-1, Assumption Q.

Rqmt ID: 020 Rqmt Classification: Other

Rqmt Text: Process analog signals shall if possible be 4 to 20-ma output.

Rqmt Basis: Standardization of signals.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1665-5.1.

Rqmt ID: 021 Rqmt Classification: Other

Rqmt Text: All alarms shall have an audible and visible component. The visible component shall flash or blink on an alarm condition.

Rqmt Basis: To adequately operate and manage the facility.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1665-5.1(a).

Rqmt ID: 022 Rqmt Classification: Other

Rqmt Text: Alarms shall require acknowledgment by operator.

Rqmt Basis: To ensure operator is aware of alarm.

Rqmt Reference: Table 1.7-1, Assumption I.

Rqmt ID: 023 Rqmt Classification: Other

Rqmt Text: Alarms shall have the time delays on all setpoints. When a setpoint is reached the time delay shall start. At the end of the time delay the alarm shall actuate.

Rqmt Basis: Prevention of nuisance alarms.

Rqmt Reference: MCP-2978, "Control of Equipment and System Status," Section 3.8.3.

Rqmt ID: 024 Rqmt Classification: Other

Rqmt Text: For alarms where noted in Appendix A, Loop Functional Descriptions, provide ENABLE/DISABLE function from the operator panel in the administration building in addition to local HMIs.

Rqmt Basis: To provide flexibility in operation.

Rqmt Reference: MCP-2978, "Control of Equipment and System Status," Section 3.8.1.

Rqmt ID: 025 Rqmt Classification: Environmental

Rqmt Text: All flow transmitters shall have flow totalizers.

Rqmt Basis: To adequately operate and manage the facility.

Rqmt Reference: 40 CFR 264.222 (b), IDAPA 58.01.05.008.

Rqmt ID: 028 Rqmt Classification: Other

Rqmt Text: All alarms shall be monitored and archived.

Rqmt Basis: To adequately operate and manage the facility.

Rqmt Reference: Table 1.7-1, Assumption N.

Rqmt ID: 029 Rqmt Classification: Environmental

Rqmt Text: Pump state (ON or OFF) shall be monitored and archived.

Rqmt Basis: To adequately operate and manage the facility.

Rqmt Reference: 40 CFR 264.301, IDAPA 58.01.05.008.

Rqmt ID: 030 Rqmt Classification: Environmental

Rqmt Text: All landfill- and pond-related sump and leak detection levels and pond-related flow signals shall be monitored and archived to track changes.

Rqmt Basis: To adequately operate and manage the facility.

Rqmt Reference: 40 CFR 264.301, 40 CFR 264.221, IDAPA 58.01.05.008.

3.3.5.2 Required Signals

For details on individual measurements, see Appendix A. Loop name as given in Appendix A is shown in parenthesis at end of Rqmt Text for this section.

Rqmt ID: 031 Rqmt Classification: Environmental

Rqmt Text: Monitor liquid level in landfill leachate sump, SU-CD-103. (L-CD-103)

Rqmt Basis: To detect water in the sump, monitor and record the level, and control related sump pumps.

Rqmt Reference: 40 CFR 264.301, IDAPA 58.01.05.008.

Rqmt ID: 032 Rqmt Classification: Environmental

Rqmt Text: Monitor liquid from drain at the truck unloading station. (L-CD-107)

Rqmt Basis: To account for liquid leaks (liquid not transferred to ponds) at the truck unloading station.

Rqmt Reference: 40 CFR 264.193, IDAPA 58.01.05.008.

Rqmt ID: 033 Rqmt Classification: Environmental

Rqmt Text: Monitor liquid level in the sumps at the crest pad buildings, SU-CD-105 & 106 (L-CD-106 & L-CD-107).

Rqmt Basis: To detect liquid in the crest pad building sumps, monitor the level, and take appropriate actions.

Rqmt Reference: 40 CFR 264.193, IDAPA 58.01.05.008.

Rqmt ID: 034 Rqmt Classification: Environmental

Rqmt Text: Control level of liquid in all ICDF Complex sumps. (H-CD-201, H-CD-203-1, H-CD-203-2, H-CD-205, H-CD-207, H-CD-208)

Rqmt Basis: Pumps will need to react to remove liquid from the sumps.

Rqmt Reference: 40 CFR 264.301, 40 CFR 264.303, IDAPA 58.01.05.008.

Rqmt ID: 035 Rqmt Classification: Other

Rqmt Text: Measure amount of all liquids into and out of evaporation ponds. (F-CD-330, F-CD-327, F-CD-203-1, F-CD-203-2, F-CD-203-4, F-CD-208)

Rqmt Basis: To control and manage flow of liquids into and out of the evaporation ponds.

Rqmt Reference: Table 1.7-1, Assumption S.

Rqmt ID: 036 Rqmt Classification: Environmental

Rqmt Text: Detect leaks into the landfill vadose zone. SU-CD-104, SU-CD-108. (L-CD-104, L-CD-108).

Rqmt Basis: To take corrective actions.

Rqmt Reference: 40 CFR 264.223, 40 CFR 264.221(g), IDAPA 58.01.05.008.

Rqmt ID: 037 Rqmt Classification: Environmental

Rqmt Text: Detect leaks into pond leak detection sumps SU-CD-101, SU-CD-102 (L-CD-101, L-CD-102).

Rqmt Basis: To take corrective actions.

Rqmt Reference: 40 CFR 264.223, 40 CFR 264.221(g), IDAPA 58.01.05.008.

Rqmt ID: 038 Rqmt Classification: Other

Rqmt Text: Measure Buildings CPP-1799, CPP-1798, CPP-1688, CPP-1689 temperatures. (T-CD-1799, T-CD-1798, T-YDJ-1688, T-YDJ-1689)

Rqmt Basis: Freeze protection.

Rqmt Reference: MCP-6103, "Seasonal Facility Planning," Section 4.2.3.c.

Rqmt ID: 039 Rqmt Classification: Other

Rqmt Text: Measure differential pressure on decontamination building, CPP-1688, HVAC HEPA filters. (PD-YDJ-6, PD-YDJ-10, PD-YDJ-14, PD-YDJ-18, PD-YDJ-22, PD-YDJ-26)

Rqmt Basis: Monitor filter loading and integrity.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1550-7.3.

Rqmt ID: 040 Rqmt Classification: Other

Rqmt Text: Monitor state (ON-OFF) of decontamination building lift station pumps, P-YDJ-203 and P-YDJ-204. (Y-YDJ-203, Y-YDJ-203)

Rqmt Basis: To control and manage the operation of the lift station.

Rqmt Reference: Table 1.7-1, Assumption M.

Rqmt ID: 041 Rqmt Classification: Other Safety

Rqmt Text: Monitor decontamination building, CPP-1688, for radiation.

Rqmt Basis: To warn personnel of potential airborne contamination.

Rqmt Reference: EDF-ER-302, "SSSTF Design Radiological Control Analysis," Table 1.7-1, Assumption O.

Rqmt ID: 042 Rqmt Classification: Other

Rqmt Text: Monitor air flow though decontamination building, CPP-1688, HVAC filters. (F-YDJ-4, F-YDJ-3)

Rqmt Basis: Verify blower operation.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1550-3.5.

Rqmt ID: 043 Rqmt Classification: Environmental

Rqmt Text: Detect leaks into decontamination lift station, MAH-YDJ-SW-498, secondary containment. (L-YDJ-498).

Rqmt Basis: To take corrective actions.

Rqmt Reference: 40 CFR 264.221(g), IDAPA 58.01.05.008.

Rqmt ID: 044 Rqmt Classification: Environmental

Rqmt Text: Detect leaks in service waste pipe line between landfill and ponds. (L-CD-499).

Rqmt Basis: To take corrective actions.

Rqmt Reference: 40 CFR 264.193, IDAPA 58.01.05.008.

3.3.6 Computer Hardware and Software

See Section 3.3.5 for requirements of data acquisition system.

3.3.7 Fire Protection

Fire protection is not within the scope of this T&FR.

3.4 Testing and Maintenance Requirements

3.4.1 TSR-Required Surveillance

No technical safety requirement (TSR) -related surveillance requirements have been identified.

3.4.2 Non-TSR Inspections and Testing

No non-TSR inspection and testing requirements have been identified.

3.4.3 Maintenance

Rqmt ID: 045 Rqmt Classification: Other

Rqmt Text: Provision shall be provided to allow calibration of instruments in the field in place if practical. For example, differential pressure transmitters shall be provided with a five-valve manifold in the configuration of a Rosemount, Inc. 305R (two blocking valves, two test/vent valves, one equalizing valve).

Rqmt Basis: For effective maintenance.

Rqmt Reference: *DOE-ID Architectural Engineering Standard*, Revision 27, Section 1665-4.3

Rqmt ID: 046 Rqmt Classification: Other

Rqmt Text: Provision shall be provided to verify switch setpoint trip during calibration. Dry starting of pumps is not an acceptable means to verify switch setpoint trip.

Rqmt Basis: Surety of calibration.

Rqmt Reference: Table 1.7-1, Assumption P.

3.5 Other Requirements

3.5.1 Security and Special Nuclear Material (SNM) Protection

Rqmt ID: 047 Rqmt Classification: Other

Rqmt Text: The control and data acquisition system shall have at least three levels of access. One shall be an operator level, one shall be an engineer or supervisor level, and one shall be an administrator level. Administrator level shall allow access to configuration of the system. Engineer level shall allow access to setpoints and ENABLE/DISABLES. Operator level shall allow access to controls indication and alarms.

Rqmt Basis: To manage system access.

Rqmt Reference: MCP-2978, "Control of Equipment and System Status," Section 3.8.1.

3.5.2 Special Installation Requirements

No special requirements identified at this time.

3.5.3 Reliability, Availability, and Preferred Failure Modes

Rqmt ID: 048 Rqmt Classification: Other

Rqmt Text: Circuit opening or device failure should result in a normal system alarm (fail-safe). Loss of analog signal shall result in a bad quality alarm on the control system.

Rqmt Basis: To identify faulty information to operators.

Rqmt Reference: DOE 5480.19, Chapter II, Section C8.

Rqmt ID: 049 Rqmt Classification: Other

Rqmt Text: The system shall alarm if communications from Buildings CPP-1798, CPP-1799, or CPP-1688 are lost.

Rqmt Basis: To identify faulty information to operators.

Rqmt Reference: DOE 5480.19, Chapter X, Section C8.

Rqmt ID: 050 Rqmt Classification: Other

Rqmt Text: Time to repair any loop shall not exceed 72 hr.

Rqmt Basis: To provide continuity of data.

Rqmt Reference: Table 1.7-1, Assumption H.

3.5.4 Quality Assurance

This project shall apply quality controls commensurate with the risk, function, and importance by applying MCP-540, "Documenting the Safety Category of System, Structures, and Components," and MCP-550, "Software Management."

3.5.5 Miscellaneous

No miscellaneous requirements have been identified.

4. REFERENCES

40 CFR 264.193, 2000, "Containment and detection of releases," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 264.221, 1999, "Design and Operating Requirements," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 264.222, 1999, "Action Leakage Rate," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 264.223, 1999, "Response Actions," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 264.226, 1999, "Monitoring and Inspection," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 264.301, 1999, "Design and Operating Requirements," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

40 CFR 264.303, 1999, "Monitoring and Inspection," *Code of Federal Regulations,* Office of the Federal Register, July 1999.

DOE O 5480.19, Change Notice 2, 2001, "Conduct of Operations Requirements for DOE Facilities," U.S. Department of Energy, October 2001.

DOE-HDBK-1140, 2001, "Human Factors/Ergonomics Handbook for the Design for Ease of Maintenance," U.S. Department of Energy, 2001.

DOE-ID, 1989, *Climatography of the Idaho National Engineering Laboratory*, DOE/ID-12118, second edition, December 1989.

DOE-ID, 1999, *Final Record of Decision, Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13*, DOE/ID-10660, Rev. 0, October 1999.

DOE-ID, 2000, DOE-ID *Architectural Engineering Standards*, Rev. 27, April 2000.

DOE-STD-1020-94, Change Notice 1, 1996, "Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities," U.S. Department of Energy, January 1996.

EDF-ER-302, 2002, "SSSTF Design Radiological Control Analysis," Rev. 0, Environmental Restoration Program, Idaho National Engineering and Environmental Laboratory, March 2002.

IDAPA 58.01.05.008, 2001, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Idaho Administrative Procedures Act, Department of Environmental Quality, March 2001, (as promulgated as of December 1999).

MCP-540, 2001, "Documenting the Safety Category of Structures, Systems and Components," Rev. 13, Facility Hazards Identification and Control, Idaho National Engineering and Environmental Laboratory, March 2001.

MCP-550, 2001, "Software Management," Rev. 5, National Security Programs, Idaho National Engineering and Environmental Laboratory, June 2001.

MCP-2978, 2001, "Control of Equipment and System Status," Rev. 3, Site Operations, Idaho National Engineering and Environmental Laboratory, January 2001.

MCP-6103, 2001, "Seasonal Facility Planning," Rev. 2, Site Maintenance, Idaho National Engineering and Environmental Laboratory, September 2001.

TFR-17, 2002, "Technical and Functional Requirements for the WAG 3 Staging, Storage, Sizing, and Treatment Facility," Rev. 2, Environmental Restoration Program, Idaho National Engineering and Environmental Laboratory, March 2002.

TFR-71, 2002, "Technical and Functional Requirements for the WAG 3 INEEL CERCLA Disposal Facility and Evaporation Pond," Rev. 2, Environmental Restoration Program, Idaho National Engineering and Environmental Laboratory, May 2002.

5. APPENDICES

Appendix A—Loop Functional Descriptions.

APPENDIX A

Loop Functional Descriptions Terminology Guide

Term	Description
Loop name	Standard INTEC way to refer to a loop. The first letter indicating type of loop using drawing 056580 Table 3, the next 2 letters after the dash being a subarea (CD for ICDF and YDJ for SSSTF). The final number being a unique identifier generally related to a structure or component. For example a level measurement for sump SU-CD-101 would have a loop name of L-CD-101. A control loop for pump P-CD-203-1 is named H-CD-203-1.
Description	Function of loop or measurement loop makes.
Safety category	Per MCP-540
Type, Accuracy	Signal from point of view of PLC. There are 4 signal types: analog in, digital in, digital out, and pulse in. Accuracy generally is not applicable to digital inputs or outputs.
Range	For analog signals what the high and low points of the measurement in engineering units. Not applicable for digital inputs and outputs.
Alarm	An alarm is a warning to the operator of an condition requiring operator action. *Local Discrete* - an alarm separate from local human-machine interface (HMI), a local screen used for control and operator information. *Local HMI* - an alarm on the local HMI *Control System (PLC)* - an alarm displayed on the operator panel in the control trailer.
Alarm setpoints	Values at which alarms occur. Letter names are based on Table 3 of drawing 056580. Last letters correspond to relation of setpoint to other alarm and switch (see below) setpoints. For example on a level a LAL is less than a LAH which is less than LSHH.
Alarm description	Description of alarms
Switch setpoint	A switch is a point involved with an interlock. The operator is not informed when an switch point is reached. (Unless an alarm exists at the same value). Letter names are based on Table 3 of drawing 056580. Last letters correspond to relation of setpoint to other alarm and switch (see above) setpoints. For example on a level a LSL is less than a LAH which is less than LSHH.
Switch description	Description of what switch does.

APPENDIX A

Term	Description
Indication	For a measurement the analog value or for a control loop the local HMI the equipment can be operated from. Local Discrete an indication separate from local human-machine interface (HMI), a local screen used for control and operator information. Local HMI an indication on the local HMI Control system (PLC) an indication displayed on the operator panel in the administration building.
Archiving	Information to be saved on data acquisition system in the administration building.
Related loops	Loops interlocked with this loop.
P&ID	Drawing reference
Notes	Description of interlocks and other information.

APPENDIX A

Term	Description
Loop name	L-CD-103-1
Description	Level SU-CD-103 Leachate collection sump Associated with pump P-CD-203-1
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zz, LAHHH=zzz
ALARM description	Sump high-high level and high-high-high level
Switch setpoint	LSL=zz, LSH=zz, LSHH=zz
Switch description	Pumps off level, Primary Pump on level, Secondary pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	Level and all alarms
Related loops	L-CD-103-2, H-CD-203-1, H-CD-203-2, F-CD-203-1
P&ID	
Notes	If level transmitter is part of pump assembly it will be necessary for both this level and the L-CD-103-2 level to be set to the same setpoints with a program to allow operating off either one. This is to allow system operation even if one pump has been removed for repair.

APPENDIX A

Term	Description
Loop name	L-CD-103-2
Description	Level SU-CD-103 Leachate collection sump Associated with pump P-CD-203-2
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zz, LAHHH=zzz
Alarm description	Sump high level and high-high-high level
Switch setpoint	LSL=zz, LSH=zz, LSHH=zz
Switch description	Pumps off level, Primary Pump on level, Secondary pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	Level and all alarms
Related loops	L-CD-103-1, H-CD-203-1, H-CD-203-2, F-CD-203-2
P&ID	
Notes	If level transmitter is part of pump assembly it will be necessary for both this level and the L-CD-103-1 level to be set to the same setpoints with a program to allow operating off either one. This is to allow system operation even if one pump has been removed for repair.

APPENDIX A

Term	Description
Loop name	L-CD-104
Description	Level SU-CD-104 Landfill Leak Detection Sump. Associated with pump P-CD-204
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zzz
Alarm description	Sump high-high level
Switch setpoint	LSL=zz, LSH=zz, LSHH=zz
Switch description	Pump off level, Pump on level, interlock with P-CD-203-1 and P-CD-203-2
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarm
Related loops	H-CD-204, H-CD-203-1, H-CD-203-2
P&ID	
Notes	High-High switch prevents operation of pumps P-CD-203-1, P-CD-203-2

APPENDIX A

Term	Description
Loop name	L-CD-105
Description	Level SU-CD-105 Building CPP-1799 sump Associated with pump P-CD-205
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zzz
Alarm description	Sump high-high level
Switch setpoint	LSL=zz, LSH=zz
Switch description	Pump off level, Pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarm
Related loops	H-CD-205, H-CD-203-1, H-CD-203-2
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	L-CD-106
Description	Level SU-CD-106 Building CPP-1798 sump
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zzz
Alarm description	Sump high-high level
Switch setpoint	LSL=zz, LSH=zz
Switch description	Pump off level, Pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarm
Related loops	H-CD-207
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	L-CD-101
Description	Level SU-CD-101 pond POND-CD-329 leak detection. Associated with pump P-CD-201
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAH=zz, LAHH=zz
Alarm description	Sump high level, Sump high-high level
Switch setpoint	LSL=zz, LSH=zz
Switch description	Pump off level, Pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	Level and all alarms
Related loops	L-CD-106, H-CD-201
P&ID	
Notes	Pump P-CD-201 is portable. It is to be used with this loop or loop L-CD-102.

APPENDIX A

Term	Description
Loop name	L-CD-102
Description	Level SU-CD-102 pond POND-CD-328 leak detection. Associated with pump P-CD-201
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAH=zz, LAHH=zz
Alarm description	Sump high level, Sump high-high level
Switch setpoint	LSL=zz, LSH=zz
Switch description	Pump off level, Pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	Level and all alarms
Related loops	L-CD-106, H-CD-201
P&ID	
Notes	Pump P-CD-201 is portable. It is to be used with this loop or loop L-CD-101.

APPENDIX A

Term	Description				
Loop name	T-CD-1799				
Description	Building CPP-1799 Temperature				
Safety category	CG				
Type, Accuracy	Analog in, +/- 5 degree F				
Range	0-150 F				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	TAL=35 F, TAH=120 F				
Alarm description	Temperature low, temperature high				
Switch setpoint	NA				
Switch description	NA				
Indication	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	All alarms				
Related loops	None				
P&ID					
Notes	Freeze protection				

APPENDIX A

Term	Description
Loop name	L-CD-108
Description	Level SU-CD-108 Landfill Secondary Leak Detection Sump. Associated with pump P-CD-208
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	0-12 inches
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAHH=zzz
Alarm description	Sump high-high level
Switch setpoint	LSL=zz, LSH=zz, LSHH=zz
Switch description	Pump off level, Pump on level
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarm
Related loops	F-CD-208
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-208
Description	Flow pump P-CD-208 outlet and totalized flow
Safety category	CG
Type, Accuracy	Analog in or Pulse in, +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-207
Description	Flow P-CD-207, combined sump flow
Safety category	CG
Type, Accuracy	Analog in +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-327
Description	Flow P-CD-327, truck unloading flow
Safety category	CG
Type, Accuracy	Analog in +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-330
Description	Flow P-CD-330, flow from SSSTF
Safety category	CG
Type, Accuracy	Analog in +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description				
Loop name	H-CD-203-1				
Description	pump P-CD-203-1 control				
Safety category	CG				
Type, Accuracy	NA				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	YA				
ALARM description	Failure to start				
Switch setpoint	NA				
Switch description	NA				
Indication (ON-OFF)	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	alarms and state (ON or OFF)				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description				
Loop name	H-CD-203-2				
Description	pump P-CD-203-1 control				
Safety category	CG				
Type, Accuracy	NA				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	YA				
ALARM description	Failure to start				
Switch setpoint	NA				
Switch description	NA				
Indication (ON-OFF)	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	alarms and state (ON or OFF)				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description
Loop name	H-CD-204
Description	pump P-CD-204 control
Safety category	CG
Type, Accuracy	NA
Range	NA
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	YA
ALARM description	Failure to start
Switch setpoint	NA
Switch description	NA
Indication (ON-OFF)	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and state (ON or OFF)
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	H-CD-208
Description	pump P-CD-208 control
Safety category	CG
Type, Accuracy	NA
Range	NA
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	YA
ALARM description	Failure to start
Switch setpoint	NA
Switch description	NA
Indication (ON-OFF)	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and state (ON or OFF)
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description				
Loop name	H-CD-205				
Description	pump P-CD-205 control				
Safety category	CG				
Type, Accuracy	NA				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	YA				
ALARM description	Failure to start				
Switch setpoint	NA				
Switch description	NA				
Indication (ON-OFF)	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	alarms and state (ON or OFF)				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description				
Loop name	H-CD-201				
Description	pump P-CD-201 control				
Safety category	CG				
Type, Accuracy	NA				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	YA				
ALARM description	Failure to start				
Switch setpoint	NA				
Switch description	NA				
Indication (ON-OFF)	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	alarms and state (ON or OFF)				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description
Loop name	Y-YDJ-203
Description	pump P-YDJ-203 status. Decon building lift station MAH-YDJ-SW-498 pump.
Safety category	CG
Type, Accuracy	NA
Range	NA
Alarm	Local Discrete NA Local HMI NA Control system (PLC) NA
Alarm setpoints	NA
ALARM description	NA
Switch setpoint	NA
Switch description	NA
Indication (ON-OFF)	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and state (ON or OFF)
Related loops	
P&ID	
Notes	

APPENDIX A

Term	Description					
Loop name	Y-YDJ-204					
Description	Pump P-YDJ-204 status. Decon building lift station MAH-YDJ-SW-498 pump.					
Safety category	CG					
Type, Accuracy	NA					
Range	NA					
Alarm	Local	Discrete	NA	Local HMI	NA	Control system (PLC) NA
Alarm setpoints	NA					
ALARM description	NA					
Switch setpoint	NA					
Switch description	NA					
Indication (ON-OFF)	Local	Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	state (ON or OFF)					
Related loops						
P&ID						
Notes						

APPENDIX A

Term	Description				
Loop name	H-CD-207				
Description	pump P-CD-207 control				
Safety category	CG				
Type, Accuracy	NA				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	YA				
ALARM description	Failure to start				
Switch setpoint	NA				
Switch description	NA				
Indication (ON-OFF)	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Archiving	state (ON or OFF)				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description				
Loop name	L-YDJ-498				
Description	Level Leak detection manhole MAH-YDJ-SW-498.				
Safety category	CG				
Type, Accuracy	Digital in				
Range	NA				
Alarm	Local Discrete	NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	LAH				
ALARM description	liquid in manhole.				
Switch setpoint	NA				
Switch description	NA				
Indication	Local Discrete	NA	Local HMI	NA	Control system (PLC) NA
Archiving	alarms				
Related loops					
P&ID					
Notes					

APPENDIX A

Term	Description
Loop name	L-CD-499
Description	Level Leak detection manhole MAH-CD-SW-499. Between landfill sump SU-CD-103 and ponds.
Safety category	CG
Type, Accuracy	Analog in, +/- 3% of reading
Range	zz
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	LAH=zzz
ALARM description	liquid in manhole.
Switch setpoint	LSHH=zz
Switch description	leachate collection pumps off
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	Level and all alarms
Related loops	H-CD-203-1, H-CD-203-2
P&ID	
Notes	High-High alarm prevents operation of pumps P-CD-203-1, P-CD-203-2

APPENDIX A

Term	Description
Loop name	T-CD-1798
Description	Building CPP-1798 Temperature
Safety category	CG
Type, Accuracy	Analog in, +/- 5 degree F
Range	0-150 F
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	TAL=35 F, TAH=120 F
Alarm description	Temperature low, temperature high
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	All alarms
Related loops	None
P&ID	
Notes	Freeze protection

APPENDIX A

Term	Description
Loop name	F-CD-203-1
Description	Flow pump P-CD-203-1 outlet and totalized flow
Safety category	CG
Type, Accuracy	Analog in or Pulse in, +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	H-CD-203-1
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-203-2
Description	Flow pump P-CD-203-2 outlet and totalized flow
Safety category	CG
Type, Accuracy	Analog in or Pulse in, +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	H-CD-203-2
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-CD-204
Description	Flow pump P-CD-204 outlet and totalized flow
Safety category	CG
Type, Accuracy	Analog in or Pulse in, +/- 7% of reading
Range	0-200 GPM
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	NA
Alarm description	NA
Switch setpoint	FSL=zz
Switch description	No flow when pump is on
Indication	Local Discrete YES (totalized) Local HMI YES Control system (PLC) YES
Archiving	Flow and totalized flow
Related loops	H-CD-204
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-6
Description	pressure difference across CPP-1688 pre-filters F-YDJ-6,7,8,9 .
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-3
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-10
Description	pressure difference across CPP-1688 pre-filters F-YDJ-10,11,12,13 .
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-4
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-14
Description	pressure difference across CPP-1688 filters F-YDJ-14,15,16,17
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-3
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-18
Description	pressure difference across CPP-1688 filters F-YDJ-18,19,20,21
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-3
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-22
Description	pressure difference across CPP-1688 filters F-YDJ-22,23,24,25
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-4
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	PD-YDJ-26
Description	pressure difference across CPP-1688 filters F-YDJ-26,27,28,29
Safety category	CG
Type, Accuracy	Analog in, +/- 1% of reading
Range	-0.5 to 0-2 inches water column
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	PDAH=1.75 inches water column, PDAL= -0.2 inches water column
Alarm description	PDAH= filter loaded, PDAL=filter failure
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NO Local HMI YES Control system (PLC) YES
Archiving	alarms and differential pressure
Related loops	F-YDJ-4
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-YDJ-3
Description	Flow CPP-1688 Ventilation system
Safety category	CG
Type, Accuracy	Digital in, +/- 4% of setpoint
Range	NA
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	FAL= 1800 CFM
Alarm description	loss of flow
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NA Local HMI NA Control system (PLC) NA
Archiving	alarm
Related loops	PD-YDJ-6, PD-YDJ-14, PD-YDJ-18
P&ID	
Notes	

APPENDIX A

Term	Description
Loop name	F-YDJ-4
Description	Flow CPP-1688 Ventilation system
Safety category	CG
Type, Accuracy	Digital in, +/- 4% of setpoint
Range	NA
Alarm	Local Discrete NO Local HMI YES Control system (PLC) YES
Alarm setpoints	FAL= 1800 CFM
Alarm description	loss of flow
Switch setpoint	NA
Switch description	NA
Indication	Local Discrete NA Local HMI NA Control system (PLC) NA
Archiving	alarm
Related loops	PD-YDJ-10, PD-YDJ-22, PD-YDJ-26
P&ID	
Notes	

APPENDIX A

Term	Description			
Loop name	T-YDJ-1688			
Description	Building CPP-1688 Temperature			
Safety category	CG			
Type, Accuracy	Analog in			
Range	0-150 F, +/- 5 degree F			
Alarm	Local Discrete NO	Local HMI	YES	Control system (PLC) YES
Alarm setpoints	TAL=35 F, TAH=120 F			
Alarm description	Temperature low, temperature high			
Switch setpoint	NA			
Switch description	NA			
Indication	Local Discrete NO	Local HMI	YES	Control system (PLC) YES
Archiving	All alarms			
Related loops	None			
P&ID				
Notes	Freeze protection			